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Mica

UNITED STATES DEPARTMENT OF THE INTERIOR

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UNITED STATES DEPARTMENT OF THE INTERIOR • Donald Paul Hodel, Secretary

BUREAU OF MINES • T S Ary, Director

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Mica

By Lawrence L. Davis[1]

In 1987, about 161,000 short tons of scrap and flake mica was produced in the United States, an increase of 9% from 1986 production.

Nearly all sheet mica supply continued to be imported. Consumption of muscovite mica block increased 15% to 57,900 pounds. Consumption of mica splittings decreased 5% to 2.1 million pounds. The value of sheet mica exports increased 4% to $4.9 million. Imports for consumption of sheet mica increased slightly to 4.1 million pounds.

Domestic Data Coverage.—Domestic production and consumption data for mica are developed by the Bureau of Mines by means of three separate, voluntary surveys and one mandatory survey. Of the 17 operations to which the crude scrap and flake mica production form was sent, 16 operations, or 94%, responded, representing 93% of the production shown in table 1. Of the 15 operations to which the ground mica form was sent, all responded, representing 100% of the production in table 1. Of the eight canvassed operations to which the mica block and film consumption form was sent, seven operations, or 88%, responded, representing 98% of the consumption shown in table 1. Of the 11 canvassed operations to which the mica splittings consumption form was sent, 9 operations, or 82%, responded, representing 94% of the splittings consumption shown in table 1. Consumption for the nonrespondents was estimated using prior year production data.

Table 1.—Salient mica statistics

	1983	1984	1985	1986	1987
United States:					
Production (sold or used by producers):					
Scrap and flake mica thousand short tons	140	161	138	148	161
Value thousands	$6,479	$7,139	$6,330	$7,108	$8,201
Ground mica thousand short tons	130	146	136	r123	124
Value thousands	$18,702	$21,334	$21,256	r$21,872	$22,376
Consumption:					
Block, muscovite thousand pounds	74	62	51	50	58
Value thousands	$961	$842	$751	$755	$982
Film thousand pounds	W	W	W	W	W
Value thousands	W	W	W	W	W
Splittings thousand pounds	2,120	2,366	2,361	2,226	2,116
Value thousands	$1,394	$1,679	$1,610	$1,252	$1,417
Exports thousand short tons	11	9	10	8	6
Imports for consumption do.	8	13	11	13	13
World: Production thousand pounds	535,231	r609,595	560,701	p636,207	e654,531

eEstimated. pPreliminary. rRevised. W Withheld to avoid disclosing company proprietary data.

Legislation and Government Programs.—With the resumption of sales of natural sheet mica in 1987, the Government inventory of stockpile-grade mica was reduced slightly to 22.2 million pounds. The General Services Adminstration sold 141,000 pounds of muscovite splittings and 3,000 pounds of muscovite film.

Table 2.—Stockpile goals and Government inventories for mica, December 31, 1987

(Thousand pounds)

Material	Goal	Inventory		Available for disposal	1987 sales
		Stockpile grade	Non-stockpile grade		
Block:					
Muscovite, Stained and better	6,200	5,008	207		
Phlogopite	210	17	114		
Film: Muscovite, 1st and 2d qualities	90	1,176	1	1,032	3
Splittings:					
Muscovite	12,630	14,513		121	141
Phlogopite	930	1,519			

DOMESTIC PRODUCTION

Scrap and Flake Mica.—North Carolina remained the major producing State with 62% of the total production. The remainder was produced in Connecticut, Georgia, New Mexico, Pennsylvania, South Carolina, and South Dakota. Most mica was recovered from mica schist, high-quality sericite schist, and as a byproduct of kaolin, feldspar, and lithium beneficiation.[2] The five largest producers were, in alphabetical order, The Feldspar Corp., Spruce Pine, NC; KMG Minerals Inc., Kings Mountain, NC; Lithium Corp. of America, Gastonia, NC; Pacer Corp., Custer, SD; and Unimin Corp., New Canaan, CT. These companies produced 68% of the national total.

Ground Mica.—Twelve companies operated fifteen grinding plants. Eleven plants produced dry-ground and four produced wet-ground mica. The five largest producers accounted for 76% of the total. They were, in alphabetical order, KMG Minerals, Kings Mountain, NC; Mineral Industrial Commodities of America Inc., Santa Fe, NM; Pacer, Custer, SD; Unimin, New Canaan, CT; and USG Corp., Chicago, IL.

Cyprus Minerals Co. agreed to purchase Foote Mineral Co. from Newmont Mining Corp. The agreement, reached late in the year, includes Foote's byproduct mica production facilities at Kings Mountain, NC.

In May, J. M. Huber Corp. broke ground for a new muscovite mica plant at Kings Mountain, NC. The plant, scheduled to open in 1988, will produce dry-ground products from mica ore mined at a nearby site.

Production of low-quality sericite, used primarily in brick manufacturing, was 34,000 tons valued at $129,000. Approximately 32,000 tons of ground sericite valued at $281,000 was sold or used. Low-quality sericite is excluded from tabulated data contained in this report.

Table 3.—Scrap and flake mica[1] sold or used by producers in the United States, by State

(Thousand short tons and thousand dollars)

State	Quantity	Value
1983	140	6,479
1984	161	7,139
1985	138	6,330
1986	148	7,108
1987:		
North Carolina	100	5,607
Other States[2]	61	2,594
Total	161	8,201

[1]Includes finely divided mica recovered from mica schist and high-quality sericite schist, and mica that is a byproduct of feldspar, kaolin, and lithium beneficiation.
[2]Includes Connecticut, Georgia, New Mexico, Pennsylvania, South Carolina, and South Dakota.

Table 4.—Ground mica sold or used by producers in the United States, by method of grinding[1]

(Thousand short tons and thousand dollars)

Year	Dry-ground		Wet-ground		Total	
	Quantity	Value	Quantity	Value	Quantity	Value
1983	118	13,907	12	4,795	130	18,702
1984	133	16,269	13	5,065	146	21,334
1985	123	15,993	13	5,263	136	21,256
1986[r]	109	14,682	14	7,190	123	21,872
1987	111	15,140	13	7,237	124	[2]22,376

[r]Revised.
[1]Domestic and some imported scrap. Low-quality sericite is not included.
[2]Data do not add to total shown because of independent rounding.

CONSUMPTION AND USES

Sheet Mica.—Consumption of muscovite block (ruby and nonruby) totaled 57,900 pounds, a 15% increase over that of 1986. Of the total muscovite block fabricated, 58% went into electronic uses; of this, the majority was used in vacuum tubes. Consumption of Stained quality decreased 5%, although it remained in greatest demand, accounting for 57% of consumption. Consumption of grades No. 5 and smaller increased 24%, while consumption of grades No. 4 and larger decreased 9%.

Eight companies continued to consume muscovite block and film in eight plants in seven States: two in North Carolina and one each in Massachusetts, New Jersey, New York, Ohio, Pennsylvania, and Virginia. The New York, Pennsylvania, and Virginia companies consumed 61% of the total.

Consumption of mica splittings decreased 5% to 2.1 million pounds. The decrease was caused by lower demand for built-up mica products. Muscovite splittings from India accounted for 97% of the consumption. The remainder was phlogopite splittings from Madagascar. The splittings were fabricated into various built-up mica products by 10 companies operating 10 plants in 8 States.

Built-Up Mica.—The primary use of this mica-base product, made by mechanical or handsetting of overlapping splittings and alternate layers of binders and splittings, was as electrical insulation material. Total production, sold or used, of built-up mica decreased 6% from that of 1986. The decrease continued the long-term decline caused by substitute materials and imported built-up mica products. Molding plates and segment plates were the major end products, accounting for 33% and 28% of the total, respectively. Other end products included flexible plates, heater plates, and tapes.

Reconstituted Mica (Mica Paper).—Four companies consumed 3.7 million pounds of scrap mica to produce 2.4 million pounds of mica paper. The principal source of this scrap mica was India. Primary end uses for mica paper were the same as those for built-up mica. Manufacturing companies were Corona Films Inc., West Townsend, MA; General Electric Co., Schenectady, NY; Kirkwood-Acim Corp., Hempstead, NY; and US Samica Corp., Rutland, VT.

Ground Mica.—The major end uses were joint cement, 57%; paint, 12%; and well-drilling muds, 6%. Other end uses included agricultural products, molded electical insulation, plastics, roofing, rubber, and welding rods.

Table 5.—Fabrication of muscovite block mica in the United States in 1987, by quality and end product use

(Pounds)

Quality	Electronic uses	Nonelectronic uses	Total
Good Stained or better	1,400	2,700	4,100
Stained	W	W	33,300
Lower than Stained[1]	W	W	20,500
Total	33,600	24,300	57,900

W Withheld to avoid disclosing company proprietary data; included in "Total."
[1]Includes punch mica.

Table 6.—Fabrication of muscovite block mica in the United States in 1987, by quality

(Pounds)

Quality	No. 4 and larger	No. 5 and smaller	Total
Good Stained or better	3,700	400	4,100
Stained	6,500	26,800	33,300
Lower than Stained	1,900	18,600	20,500
Total[1]	12,000	45,900	57,900

[1]Data may not add to totals shown because of independent rounding.

Table 7.—Consumption and stocks of mica splittings in the United States, by source

(Thousand pounds and thousand dollars)

	India		Madagascar		Total[1]	
	Quantity	Value	Quantity	Value	Quantity	Value
Consumption:						
1983	2,079	1,257	41	137	2,120	1,394
1984	2,323	1,537	42	141	2,366	1,679
1985	2,327	1,485	34	125	2,361	1,610
1986	2,197	1,136	29	116	2,226	1,252
1987	2,050	1,231	67	185	2,116	1,417
Stocks on Dec. 31:						
1983	1,187	NA	148	NA	1,335	NA
1984	877	NA	77	NA	954	NA
1985	1,085	NA	41	NA	1,126	NA
1986	1,249	NA	95	NA	1,344	NA
1987	899	NA	9	NA	908	NA

NA Not available.
[1]Data may not add to totals shown because of independent rounding.

Table 8.—Built-up mica[1] sold or used in the United States, by product

(Thousand pounds and thousand dollars)

Product	1986		1987	
	Quantity	Value	Quantity	Value
Flexible (cold)	190	803	177	626
Heater plate	63	132	51	88
Molding plate	624	2,326	680	2,397
Segment plate	686	2,940	571	2,211
Tape	253	1,559	161	1,197
Other	392	1,741	429	1,758
Total[2]	2,209	9,501	2,069	8,277

[1]Consists of alternate layers of binder and irregularly arranged and partly overlapped splittings.
[2]Data may not add to totals shown because of independent rounding.

Table 9.—Ground mica sold or used by producers in the United States, by end use

(Thousand short tons and thousand dollars)

End use	1986		1987	
	Quantity	Value	Quantity	Value
Joint cement	63	10,499	71	11,352
Paint	22	3,676	15	3,012
Plastics	1	252	2	336
Well-drilling mud	5	576	7	797
Other[1]	r32	r6,868	28	6,877
Total[2]	r123	r21,872	124	22,376

rRevised.
[1]Includes mica used for agricultural products, molded electrical insulation, plastics, rubber, textile and decorative coatings, and welding rods.
[2]Data may not add to totals shown because of independent rounding.

STOCKS

Reported yearend consumer stocks of sheet mica decreased 31% to 1.0 million pounds; of this, mica splittings represented 87% and mica block represented 13%.

PRICES

Average reported values of consumed muscovite sheet mica changed as follows: Block decreased 43% to $11.19 per pound; film increased 178% to $13.66 per pound; and splittings increased 15% to $0.60 per pound. The average value of phlogopite block increased 30% to $6.08 per pound, while the value of phlogopite splittings decreased 31% to $2.78 per pound. The large changes in average value are more a reflection of the quality of mica consumed during the year than actual changes in price. For example, much more lower quality, lower valued muscovite block mica was consumed in 1987 than in 1986.

The average value of crude scrap (flake) mica, including high-quality sericite, was $51 per ton. The average value per ton for North Carolina scrap (flake) mica, predominantly a flotation product, was $56.

Table 10.—Average reported price for dry- and wet-ground mica sold or used by U.S. producers in 1987

(Dollars per short ton)

Kind	Price
Wet-ground	544
Dry-ground	136
End uses:	
Joint cement	159
Paint	200
Plastics	153
Well-drilling mud	107
Other[1]	243

[1]Includes mica used for agricultural products, molded electrical insulation, roofing, rubber, textile and decorative coatings, welding rods, and miscellaneous.

FOREIGN TRADE

The United States continued to rely on imports, mostly from India, for nearly all of its unmanufactured sheet mica and paper-quality scrap mica. Imports for consumption of unmanufactured block, film, and splittings increased 32% to 2.5 million pounds. The increase was a reflection of lower than average sales of mica from the Government stockpile. About 6,000 tons of ground mica was imported, mostly from Canada, while about 5,000 tons was exported to 27 countries. The combined value of all mica imports increased 13% to $10.3 million, while the combined value of all mica exports decreased 7% to 6.4 million.

Table 11.—U.S. exports of mica and manufactures of mica in 1987, by country

(Thousand pounds and thousand dollars)

Country	Scrap and flake mica				Sheet mica		
	Ground or pulverized		Waste and scrap[1]		Unmanufactured block, film, splittings		Manufactured, cut or stamped, built-up
	Quantity	Value	Quantity	Value	Quantity	Value	Value
Argentina	42	4	--	--	--	--	93
Australia	16	2	--	--	--	--	261
Brazil	--	--	--	--	--	--	612
Canada	2,502	289	32	5	--	--	1,663
Ecuador	22	8	--	--	--	--	89
France	176	13	34	5	--	--	19
Germany, Federal Republic of	396	44	84	12	--	--	37
India	--	--	--	--	--	--	45
Italy	302	39	--	--	--	--	2
Japan	850	143	50	7	142	124	158
Korea, Republic of	464	124	--	--	26	17	49
Mexico	1,204	122	1,398	199	--	--	709
Netherlands	378	82	--	--	--	--	651
Philippines	122	33	30	5	--	--	2
South Africa, Republic of	--	--	--	--	--	--	55
Spain	1,216	163	--	--	--	--	--
Sweden	--	--	--	--	--	--	54
Taiwan	184	19	--	--	--	--	98
United Kingdom	378	44	176	25	--	--	9
Venezuela	250	34	--	--	--	--	59
Other[2]	836	114	12	2	2	4	84
Total[3]	9,338	1,275	1,816	259	170	145	4,748

[1]Some shipments of ground mica are included in this category.
[2]Includes Bahamas, Barbados, Belgium, Chile, Colombia, the Dominican Republic, Guatemala, Hong Kong, Indonesia, Ireland, Israel, Kuwait, the Leeward and Windward Islands, Malaysia, the Netherlands Antilles, Panama, Peru, Saudi Arabia, Suriname, and Switzerland.
[3]Data may not add to totals shown because of independent rounding.

Source: Bureau of the Census.

Table 12.—U.S. imports for consumption of scrap and flake mica, by country

(Thousand pounds and thousand dollars)

Country	Waste and scrap		Ground or pulverized	
	Quantity	Value	Quantity	Value
1985	7,960	718	12,097	2,202
1986	9,945	1,225	12,017	2,324
1987:				
Canada	57	6	12,250	2,322
India	7,900	1,159	44	2
Indonesia	441	47	--	--
Italy	220	29	72	13
Other[1]	18	1	141	348
Total[2]	8,635	1,243	12,507	2,685

[1]Includes Austria, Brazil, the Federal Republic of Germany, Japan, and Switzerland.
[2]Data may not add to totals shown because of independent rounding.

Source: Bureau of the Census.

Table 13.—U.S. imports for consumption of unmanufactured sheet mica, by country

(Thousand pounds and thousand dollars)

Country	Block		Splittings		Not cut or stamped, not over 0.006 inch in thickness[1]	
	Quantity	Value	Quantity	Value	Quantity	Value
1985	55	112	1,624	957	5	11
1986	11	61	1,824	580	32	13
1987:						
Belgium	--	--	1	33	--	--
France	70	159	(2)	3	--	--
India	14	32	2,323	940	--	--
Indonesia	--	--	40	15	--	--
Mexico	(2)	1	--	--	--	--
United Kingdom	11	43	--	--	1	4
Total	95	235	2,364	991	1	4

[1]Including film.
[2]Less than 1/2 unit.

Source: Bureau of the Census.

Table 14.—U.S. imports for consumption of manufactured sheet mica, by country

(Thousand pounds and thousand dollars)

Country	Cut or stamped				Plates and built-up		Articles not especially provided for	
	Not over 0.006 inch in thickness		Over 0.006 inch in thickness					
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
1985	60	510	120	560	729	1,540	69	544
1986	32	348	66	291	1,677	3,329	331	891
1987:								
Belgium	--	--	--	--	1,077	2,633	278	665
France	--	--	--	--	74	143	9	23
Germany, Federal Republic of	--	--	--	--	--	--	11	61
India	42	407	54	327	5	12	53	504
Japan	--	--	7	42	3	15	15	110
Other[1]	--	--	1	23	(2)	4	15	157
Total[3]	42	407	62	392	1,159	2,807	382	1,519

[1]Includes Brazil, Canada, China, Italy, Mexico, Spain, Switzerland, Taiwan, and the United Kingdom.
[2]Less than 1/2 unit.
[3]Data may not add to totals shown because of independent rounding.

Source: Bureau of the Census.

Table 15.—Summation of U.S. mica trade data

(Thousand pounds and thousand dollars)

	Scrap and flake mica				Sheet mica			
	Ground or pulverized		Waste and scrap[1]		Unmanufactured block, film, splittings		Manufactured, cut or stamped, built-up	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Exports:								
1983	16,430	2,112	3,986	545	70	109	NA	4,001
1984	11,500	1,506	3,806	532	348	549	NA	4,519
1985	14,460	1,962	2,918	408	82	159	NA	5,103
1986	11,686	1,758	3,206	472	98	196	NA	4,502
1987	9,338	1,275	1,816	259	170	145	NA	4,748
Imports for consumption:								
1983	10,304	1,873	3,787	316	1,899	986	735	2,583
1984	12,814	2,266	10,384	985	1,480	644	856	2,836
1985	12,097	2,202	7,960	718	1,683	1,080	978	3,154
1986	12,017	2,324	9,945	1,225	1,866	652	2,105	4,859
1987	12,507	2,685	8,635	1,243	2,460	1,230	1,645	5,125

NA Not available.
[1]Some shipments of ground mica are included in this category

Source: Bureau of the Census.

WORLD REVIEW

World production of mica increased slightly to 655 million pounds. India continued to lead the world in production of sheet mica. The United States continued to lead in the production of scrap (flake) mica.

Canada.—Lacana Mining Corp., Canada's only mica producer, announced plans to further expand its processing facilities at Boucherville, Quebec. The expansion, scheduled for completion in late 1988, will increase annual capacity to 20,000 tons. Major markets for Lacana's mica were the United States, 50%, and Canada, 25%. The remainder was exported to Australia, Japan, and Western Europe.[3]

Another company, Industrial Mica Ltd., was studying the feasibility of developing two phlogopite deposits in the St. Maurice River area of northern Quebec.[4]

Finland.—Kemira Oy began full production of ground mica from its new plant near Siilinjarvi. The mica, separated during beneficiation of apatite ore, is wet-ground to various sizes in the 16,000-ton-per-year plant.[5]

Spain.—Caolines de Vimianzo S.A. constructed a plant to recover mica from the underflow of cyclones being used to process kaolin. The plant, at Vimianzo, La Coruna, will use flotation methods to separate the muscovite mica from quartz. Annual capacity was expected to be about 12,000 tons per year.[6]

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[1]Physical scientist, Branch of Industrial Minerals.
[2]Production of high-quality sericite is included in the totals; however, figures for low-quality sericite, used principally for brick manufacturing, are not included.
[3]Industrial Minerals (London). Lacana to Expand Mica Production. No. 242, Nov. 1987, p. 9.
[4]Benbow, J. Mica—Markets Built on Dry Ground. Ind. Miner. (London), No. 245, Feb. 1988, p. 26.
[5]Work cited in footnote 4.
[6]Industrial Minerals (London). Mica Plant for Cavisa. No. 237, June 1987, p. 11.

Table 16.—Mica: World production, by country[1]

(Thousand pounds)

Country[2]	1983	1984	1985	1986[p]	1987[e]
Argentina:					
Sheet	62	26	701	551	440
Waste, scrap, etc	628	613	611	[e]600	550
Brazil	7,926	[r]8,834	6,352	4,850	5,500
Canada[e]	23,000	23,000	25,000	26,000	26,000
France	20,472	23,929	22,231	23,885	24,000
India:[e]					
Exports:					
Block	2,400	2,400	2,600	2,600	2,600
Film and disk	440	440	550	550	550
Splittings	7,000	7,000	8,800	8,800	8,800
Scrap	15,500	15,500	24,200	24,200	24,200
Powder	9,000	9,000	10,400	10,400	10,400
Manufactured	1,100	1,100	2,200	2,200	2,200
Domestic consumption, all forms	6,600	6,600	7,700	7,700	8,800
Total	42,040	42,040	56,450	56,450	57,550
Korea, Republic of (all grades)	31,751	53,872	44,189	92,587	88,000
Madagascar (phlogopite)	1,585	1,587	1,299	3,514	3,300
Mexico (all grades)	3,439	3,695	3,188	[e]3,100	3,100
Morocco	[r]1,100	2,646	3,175	[e]3,300	3,300
Mozambique[e]	[3]681	660	660	300	300
Namibia	220	198			
Peru[e]	1,200	1,200	1,200	[r]1,200	1,200
South Africa, Republic of:					
Sheet	—	—	179	—	—
Scrap	5,891	9,872	4,568	5,531	[3]2,877
Spain	2,866	2,183	1,603	717	550
Sri Lanka (scrap)[e]	[3]377	440	440	440	440
Sudan	22	22	[e]22	22	22
Taiwan	686	670	[e]250	1,706	1,102
Tanzania (sheet)	(4)	(4)	(4)	(4)	(4)
U.S.S.R. (all grades)[e]	108,000	108,000	110,000	110,000	110,000
United States (scrap and flake)[5]	280,000	322,000	275,100	296,300	[3]321,100
Yugoslavia[e]	[3]2,086	2,100	2,200	2,200	2,200
Zimbabwe	1,199	2,008	1,283	2,954	3,000
Grand total	535,231	[r]609,595	560,701	636,207	654,531

[e]Estimated. [p]Preliminary. [r]Revised.
[1]Table includes data available through May 13, 1988.
[2]In addition to the countries listed, China, Norway, Pakistan, Romania, and Sweden are known to produce mica, but available information is inadequate to make reliable estimates of output levels.
[3]Reported figure.
[4]Less than 1/2 unit.
[5]Excludes U.S. production of low-quality sericite.